

Topical Use of Post-Application Expanding Cosmetic Composition

This application is a continuation-in-part of application Serial No. 10/331,069, filed December 27, 2002.

**BACKGROUND OF THE INVENTION**

1. Field of the Invention

The present invention provides a method for improving the appearance of the skin by topically applying thereto a leave-on post-application expanding composition. The composition comprises an agent which, due to its volatility, will expand after it is applied to skin ("a volatile agent"), a film forming agent and, optionally, a colorant, preferably a pigment. The method of the present invention can be employed to provide fullness to the lips, mask skin fine lines, wrinkles, depressions, acne scars and level the surface of the skin.

2. Description of the Related Art

Post-application expanding compositions are known in the art. For example, US patent 3,541,581 discloses a cleansing or cosmetic composition in the form of a stable, post-foaming shaving gel. The disclosed gel has a yield value sufficiently high to substantially restrain the composition from foaming for at least about 60 seconds under static ambient conditions. The '581 patentee states that an object of the invention is to provide a lather-producing composition that, in addition to possessing the desirable properties of prior art compositions, is characterized by being discharged as a stable gel that is substantially free from foaming. After it is spread over the skin and beard, the gel produces a post generating foam. The purpose of the invention is to provide a lather, in-situ, on the surface of the skin so as to facilitate shaving of facial hair. The invention is also disclosed to be useful in topical applications for cleansing. Moreover, coloring materials, such as dyes may be used if desired. However, unlike the present invention, this composition is not a leave-on composition

US Patent 4,528,111 discloses a stable shaving cream gel that is asserted to possess superior foaming and after-feel characteristics. Various compatible additives which do not

adversely affect the gel structure may be added in minor amounts. Coloring materials are included among the materials exemplified as suitable for such purpose. A combination of the dyes D & C Yellow #10 and F D & C Blue #1 is employed in Examples 6 through 10. They are however used in very low concentration. For example 1.2% of a 1% trituration of D& C Yellow #10 dye and 0.45% of a 1% trituration of F D & C Blue #1 dye are employed in Example 7. Moreover, this composition is not a leave-on composition.

Though the post-foaming compositions of the prior art have been used for shaving facial hair and though such compositions may contain minor amounts of a dye to impart to the composition a coloration more pleasing to the consumer, such compositions have heretofor found no further use. Moreover, such compositions are applied then soon removed. For example, a post-application expanding shave gel is applied to the face then promptly removed by the razor during the shaving process. Prior to the present invention, post-application expanding compositions have not been employed as leave-on compositions.

The present inventors has discovered that compositions that expand after application, such as the delayed post-foaming compositions of the prior art, can be surprisingly and advantageously modified, applied to the skin and allowed to remain thereon to improve the aesthetic appearance of skin surfaces, especially skin of the lips and face.

## SUMMARY OF THE INVENTION

The present invention relates to the topical use of a leave-on composition that expands after application, such as a post-foaming composition. More particularly, the invention relates to a method for imparting an improvement in the appearance of skin, such as the appearance of fullness, particularly the lips, or the masking of skin fine lines, wrinkles, depressions and acne scars or the appearance of a leveling of the skin. The method entails topically applying to the skin a leave-on composition that expands after application.

The method of the present invention utilizes a composition that contains a surfactant, a solvent for the surfactant, a film former and a volatile agent that will expand after the composition is applied to the skin.

The film-forming agent is present in an amount effective to form a film after the composition is applied to the skin. Alternatively, a colorant (preferably, a pigment) is present in an amount sufficient to mask the color of the foam formed after the composition is applied to the skin. Preferably, both the film-forming agent and the colorant are present. When it is desired  
5 that the skin of the lips be treated, the colorant can be employed in an amount effective to impart a color to the lips.

The volatile agent can be maintained in a dispersed state in the composition by storing the composition in a pressurized container (hereinafter referred to as the "Pressurized System").

10 Alternatively:

1) the volatile agent can be solubilized in the composition by including in the composition a solubilizing amount of a solubilizing agent such as:

- 15 (i) a block polymer, preferably a block polymer ether, such as MEROXAPOL block polymers, POLOXAMER block polymers, POLOXAMINE block polymers, or mixture thereof;
- (ii) polyvinyl alcohol or a polyvinyl alcohol alternative, such as (PEG-800/polyvinyl alcohol copolymer, sodium MA/vinyl alcohol copolymer, acetylated polyvinyl alcohol, vinylamine/vinyl alcohol copolymer, VP/VA copolymer, polyvinyl acetate and polyvinylacetal  
20 diethylaminoacetate, (PEG-800/polyvinyl alcohol copolymer, sodium MA/vinyl alcohol copolymer, acetylated polyvinyl alcohol, vinylamine/vinyl alcohol copolymer and VP/VA copolymer are preferred polyvinyl alcohol alternatives); or

25 (iii) a mixture thereof (this alternative is herein referred to as the "Solubilization System");

2) the volatile agent can be dispersed throughout the composition in nanometer sized droplets, in which case the composition is preferably in the form of a microemulsion (this alternative is herein referred to as the "Microemulsion  
30 System"); or

3) the volatile agent can be generated in situ on the skin or just prior to application to the skin, preferably by reaction of a cosmetically acceptable acid, such as citric acid, with a cosmetically acceptable base, such as sodium or potassium bicarbonate, in the presence of water, in which case the volatile agent, carbon dioxide, is produced (this alternative is referred to herein as the "Two Part System").

The Solubilization, Microemulsion and Two Part Systems (corresponding respectively to the above alternatives 1, 2 and 3 (hereinafter referred as the "Non-Pressurized Systems") obviate the need for storing the composition in a pressurized container.

In its broadest form, the present invention includes the topical use of any cosmetically acceptable composition for application to the skin, especially the skin of the lips or face, wherein the composition expands when applied to the skin, upon application or after a predetermined time period thereafter, then sets up in its expanded state, to provide beneficial characteristics to the skin, such as, in the case of the lips, the appearance of greater fullness or, in the case of the face, a leveling effect.

The method of the present invention involves applying a leave-on post-application expanding composition to an area of the skin where an improvement in appearance is desired. The composition is a leave-on composition because it is permitted to remain on the skin for a period of at least one hour, preferably several hours, more preferably at least 4 hours, and most preferably at least 8 hours.

Preferably, the container for the post-application expanding composition employed in the method of the invention contains on its label, outer package, product insert or promotional material, written indicia instructing that the composition be applied and maintained on the skin for such period.

**DETAILED DESCRIPTION OF THE INVENTION**

The method of the present invention employs a composition that is comprised of (i) a post-foaming component comprising a volatile agent, one or more surfactants, and a solvent for the surfactant(s) and (ii) a film forming agent or colorant. Preferably, the composition is comprised of (i) a post-foaming component comprising a volatile agent and one or more surfactants and (ii) a film forming agent. More preferably, the composition is comprised of (i) a post-foaming component comprising a volatile agent, one or more surfactants, and a solvent for the surfactant(s), (ii) a film forming agent and (iii) a colorant, preferably, a pigment.

**Post-Foaming Component**

The first necessary component of the post-application expanding composition utilized in the method of the present invention is a post-foaming component comprised of one or more surfactants, a solvent for the surfactant(s), and a volatile agent (blowing agent) that foams the surfactant(s).

Post-foaming compositions, particularly post-foaming gel compositions, are known in the art. For purposes of the present invention, a post-foaming composition is a composition that does not create a foam as it is dispensed from its container, but creates a foam after exposure to atmospheric pressure for at least 2 seconds. However, a post-foaming composition may foam even sooner when exposed to mechanical manipulation and/or to temperatures greater than ambient temperature. The topical use of such post-foaming compositions is also within the scope of the present invention.

It should be noted that as used herein, the terms "post-expanding" and "post-application expanding" are synonymous.

It should be appreciated that any cosmetically acceptable post-foaming system can be employed in preparing the post-application expanding compositions utilized in the method of the present invention.

The post-foaming gels of US Patents 2,995,521; 3,541,581; 3,654,167; 4,405,489; 4,528,111; 4,651,503; 6,165,456 and US Patent Application Publication US 2002/0122772 A1, the entire disclosures of which are incorporated herein by reference, are non-limiting examples of suitable post-foaming gels. The post-foaming gels of US Patents 3,541,581; 4,528,111 and  
5 US Patent Application Publication US 202/0122772 A1 are preferred. The post-foaming gel of US Patent 3,541,581 is most preferred as the post-foaming component of the post-expanding composition employed in the method of the present invention. For ease of removal of the composition, using a water-rinseable post-foaming component is preferred.

10 When the composition employed in the method of the present invention is based upon the system described in US Patent 3,541,581, in other words, when the composition utilizes the post-foaming gel of the '581 patent as the post-foaming component of the composition, the composition is in the form of a stable, post-foaming gel comprised of (i) about 30 to about 90% by weight water; (ii) a surfactant selected from a group consisting of anionic surfactants,  
15 nonionic surfactants, amphoteric surfactants, (including zwitterionic surfactant) and mixtures thereof, with the proviso that when a water-soluble salt of a fatty acid is employed as the surfactant, it is present in an amount of about 0.1 to about 25% by weight and when the surfactant employed is other than a water-soluble salt of a fatty acid, it is present in an amount of about 0.1 to about 12.0% by weight; (iii) about 0.1 to about 15% by weight of volatile liquid  
20 post-foaming material ("a volatile agent") selected from the group consisting of aliphatic hydrocarbons, halogenated hydrocarbons, perhalogenated hydrocarbons (particularly perfluorinated hydrocarbons), and mixtures thereof; (iv) about 0.1 to about 0.8% by weight of an antimicrobial or preservative; (v) about 1 to about 30% by weight of a polymer film forming agent (as will be elaborated upon more fully later on in the present disclosure); (vi) about 0.5 to  
25 about 15% by weight of pigment (including coated and uncoated pigments and combinations thereof); and (vii) about 0.01 to about 5% by weight of at least one water-soluble gelling agent which when incorporated in the composition provides a gel having a yield value high enough to restrain the composition from foaming for at least 2, preferably 5, and more preferably 10 seconds, under static ambient conditions and/or in combination with mechanical manipulation,  
30 e.g., with a mascara applicator. A composition based upon the post-foaming gel of US patent 3,541,581 is further described in Example 1 of the present application.

Although the focus has been on the use of a post-foaming component (surfactant(s), solvent and volatile agent) in accordance with US Patent 3,541,581, as noted earlier, any topically acceptable post-foaming system can be employed as the post-foaming component of the composition employed in the method of the present invention. For example, the post-foaming gel composition of US Patent 4,528,111 or the self-foaming gel of US Patent Application Publication US 2002/0122772 A1 may be employed as the post-foaming component of the composition employed in the method of the present invention.

The post-foaming gel of US Patent 4,528,111 is also suitable as the post-foaming component of the composition. The post-foaming system of the '111 patent is provided by the interpolymer gel reaction products of selective anionic polymers, and selective cationic polymers. This gel is a water soluble interpolymer gel reaction product formed by the rapid and intensive interaction of two oppositely charged selective polymers; a quaternized cationic polymer bearing positive charges and selected from the group consisting of poly(diallyldimethylchloride-co-acrylamide) and a quaternary ammonium cellulose ether polymer, and an anionic polymer bearing negative charges and selected from the group consisting of poly(2-acrylamido-2-methylpropane sulfonic acid) and alginic acid. The selective group of anionic polymers include: polysulfonic acid ("PSA") such as poly(2-acrylamido-2-methylpropane sulfonic acid) available as POLYMER HSP 1180 from Henkel as a 15% aqueous solution and alginic acid in free acid form, which is water-insoluble and available as a powder. Typically, what is employed is about 0.05-5%, preferably 0.1-1.0%, of a water-soluble interpolymer gel reaction product of a quaternized cationic polymer selected from the group consisting of poly(diallyldimethyl chloride-co-acrylamide) and a quaternary ammonium cellulose ether polymer, and an anionic polymer selected from the group consisting of poly(2-acrylamido-2-methylpropane sulfonic acid) and alginic acid; and about 55-94% water.

The method of preparing interpolymer gels that can be employed for purposes of the present invention comprises the rapid mixing, at a rate of at least 1000 rpm, of high concentrations of the aforesaid selective anionic and selective cationic polymers in an aqueous medium substantially free of interfering ingredients, such as salt, amphoteric, anionic and cationic compounds. The selective group of quaternized cationic polymers used in the

preparation of the water-soluble interpolymer gels are water-soluble and include poly(diallyldimethylammonium chloride-co-acrylamide), which is the copolymer of dimethyldiallylammonium chloride and of acrylamide, having a molecular weight of more than 500,000, and sold under the name MERQUAT 550 and MERQUAT S by the Merck Company and obtainable as an 8% aqueous solution.

The interpolymer reactions of polycationic and polyanionic materials produce reaction products ranging from insoluble precipitates to water-soluble and water-insoluble but swellable gels. The reaction product of poly(2-acrylamido-2-methylpropane sulfonic acid) (PSA) and MERQUAT 550 loses its fluidity and forms a clear gel at 7.5% PSA and 4% MERQUAT 550, while the individual solutions flow freely. The minimum concentration required for the formation of the interpolymer gel reaction product of PSA and MERQUAT 550 is 7.5% PSA and 4% MERQUAT 550. The aqueous reaction mixture, which is the sum total of both solutions, contains 3.75% PSA and 2% MERQUAT 550. The gel, when diluted to 1.89% PSA and 0.96% MERQUAT 550, still exhibits a high viscosity of more than 24,000 cps, while the individual solutions show a viscosity of 400 cps and 200 cps, respectively. This gel is prepared by vigorously mixing a 7.5-15% solution of PSA and a 4-8% solution of MERQUAT 550. Slow mixing results in white precipitates within the gel. Further dilution of the two solutions before mixing also results in white precipitates when they are mixed. This clearly indicates that it requires fast and intensive interactions of the two opposite charges to ensure obtaining the maximum amount of ion pair formation to give the gel structure. Whether the gel is water-soluble or water-insoluble depends on the formation of intimate or loose ion pairs which, in turn, depends on the charge density and structure of the polyelectrolytes.

#### Surfactant System

As noted earlier herein, the post-foaming gel of US Patent Application Publication US 2002/0122772 A1 can be employed as the post-foaming component of the composition employed in the method of the present invention.



The post-foaming component includes a surfactant system comprised of one or more surfactants and a solvent for the surfactant(s), preferably, water or a mixture of water and one or more alcohols, most preferably water. The surfactant can be an anionic surfactant, an amphoteric or zwitterionic surfactant, a nonionic surfactant or a mixture thereof.

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Preferably, the anionic surfactant is selected from the group consisting of water-soluble salts of fatty acids, preferably C<sub>10</sub> to C<sub>22</sub> fatty acids, alkyl sulfates; alkyl ether sulfates; alkyl monoglyceryl ether sulfates; alkyl monoglyceride sulfates; alkyl monoglyceride sulfonates; alkyl sulfonates; alkylaryl sulfonates; alkyl sulfosuccinates; alkyl ether sulfosuccinates; alkyl sulfosuccinates; alkyl amidosulfosuccinates; alkyl carboxylates; alkyl amidoethercarboxylates; alkyl succinates; fatty acyl sarcosinates; fatty acyl amino acids; fatty acyl taurates; fatty alkyl sulfoacetates; alkyl phosphates; alkyl ether phosphates; and mixtures thereof. A preferred anionic surfactant is sodium laureth sulfate.

Examples of amphoteric and zwitterionic surfactants that can be employed include amphocarboxylates, alkyl betaines, amidoalkyl betaines, amidoalkyl sultaines, amphophosphates, phosphobetaines, pyrophosphobetaines, carboxyalkyl alkyl polyamines, alkyl amino monoacetates, alkyl amino diacetates, and mixtures thereof. Betaine surfactants are preferred. Cocamidopropyl betaine is most preferred.

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One class of nonionic surfactants useful in the present invention are polyoxyethylene derivatives of polyol esters, wherein the polyoxyethylene derivative of polyol ester (1) is derived from (a) a fatty acid containing from about 8 to about 22, and preferably from about 10 to about 14 carbon atoms, and (b) a polyol selected from sorbitol, sorbitan, glucose, alpha-methyl glucoside, polyglucose having an average of about 1 to about 3 glucose residues per molecule, glycerin, pentaerythritol and mixtures thereof, (2) contains an average of from about 10 to about 120, and preferably about 20 to about 80 oxyethylene units; and (3) has an average of about 1 to about 3 fatty acid residues per mole of polyoxyethylene derivative of polyol ester.

Examples of preferred polyoxyethylene derivatives of polyol esters include PEG-80 sorbitan laurate and Polysorbate 20. PEG-80 sorbitan laurate, which is a sorbitan monoester of

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lauric acid ethoxylated with an average of about 80 moles of ethylene oxide, is available commercially from ICI Surfactants of Wilmington, Del. under the tradename, "ATLAS G-4280." Polysorbate 20, which is the laurate monoester of a mixture of sorbitol and sorbitol anhydrides condensed with approximately 20 moles of ethylene oxide, is available commercially from  
5 Uniqema Company under the trade name "TWEEN 20."

Another class of suitable nonionic surfactants includes long chain alkyl glucosides or polyglucosides, which are the condensation products of (a) a long chain alcohol containing from about 6 to about 22 carbon atoms, preferably from about 8 to about 14 carbon atoms, with (b)  
10 glucose or a glucose-containing polymer. The alkyl glucosides have about 1 to about 6 glucose residues per molecule of alkyl glucoside. Alkyl glucosides are the preferred nonionic surfactants. Suitable alkyl glucosides include, but are not limited to, octyl glucoside, decyl glucoside, and lauryl glucoside.

15 Additional nonionic surfactants that may be used include: ethylene oxide/propylene oxide copolymers, (poly)glycerol esters and fatty acids, fatty acid alkanolamides, alkoxylated mono and di-alkanolamides, aminoxides, ethoxylated fatty alcohols and esters, fatty acid sucrose esters, ethoxylated glucosides, and fatty gluconamides.

## 20 Volatile Agent

In addition to the surfactant system, the post-foaming component includes a volatile or blowing agent to initiate post foaming. Suitable for this purpose are volatile or blowing agent(s) (halogenated or non-halogenated, synthetic or naturally occurring) with a vapor pressure from  
25 about 0.5 Torr to about 30,000 Torr, preferably from about 5.0 Torr to about 5,000 Torr, and more preferably, from about 100 Torr to about 2,500 Torr, at a temperature of about 0° to about 100° C.

Examples of preferred volatile agents include but are not limited to n-pentane,  
30 isopentane, neopentane, n-butane, isobutane, isobutene, cyclopentane, hexane, trichlorotrifluoroethane, 1,2-dichloro, 1,1,2,2-tetrafluoroethane, hydrofluoroethers (eg. methyl

perfluorobutyl ether/ methyl perfluoroisobutyl ether (CF-61, NOVEC-7100, a product of 3M), ethyl perfluorobutyl ether/ ethyl perfluoroisobutyl ether (CF-76, NOVEC HFE-7200, a product of 3M), 2-trifluoromethyl-3-ethoxydodecafluorohexane (NOVEC HFE-7500, a product of 3M)), methyl perfluoropropyl ether, and mixtures thereof. Other suitable volatile agents may include, but are not limited to, perfluoromethylcyclohexane, manufactured by F2 Chemicals Ltd. under the trade name Flutec PP2, or Flutec PC2; perfluoromethylcyclopentane, available from the same company under the trade name Flutec PC1C; and perfluorohexane and perfluorodimethylcyclohexane, available from the same company under the trade names Flutec PC1 and Flutec PC3, respectively. Perfluorodimethylcyclopentane (molecular weight of about 350) is also expected to be suitable in the present invention.

#### Film Forming Agent

The post-application expanding composition employed in the method of the present invention preferably contains a film forming agent.

The film forming agent is present in an amount sufficient so that when the post-application expanding composition is applied to the skin of the lips, or face, and the post-foaming component begins to foam and expand the composition, the film formed by the film forming agent will stabilize at least a portion of the foam lattice when it sets (as will be elaborated on more fully below) and fix at least a portion of the composition in an expanded state.

The film forming agent can be natural or synthetic. Film forming waxes are known in the art and can be employed alone or in combination with one or more natural or synthetic film forming agents. Synthetic film forming agents, for example, acrylates copolymers and/or methacrylates copolymers, acrylamide copolymers, and mixtures thereof, are particularly preferred.

Water-soluble film forming agents that can be utilized are exemplified in monographs 27-33 of the International Cosmetic Ingredient Dictionary and Handbook, 9<sup>th</sup> Ed. (2002). Particularly preferred film formers include; (i) acrylamide copolymer; for example,

acrylamides/DMAPA acrylates/methoxy PEG methacrylate copolymer, acrylamide/sodium acrylate copolymer, acrylamide/sodium acryloyldimethyltaurate copolymer, acrylates/acrylamide copolymer, acrylates/t-butylacrylamide copolymers and (ii) acrylates copolymer, for example, BF Goodrich's AVALURE AC115, AVALURE AC118, AVALURE AC120, AVALURE  
5 AC125, AVALURE AC210 and AVALURE AC315; LCW's COVACRYL A15 and COVACRYL E14; Daito Kasei's DAITOSOL 5000 AD; acrylates/C1-2 succinates/hydroxyacrylates copolymer; acrylates/dimethicone copolymer; acrylates/dimethicone methacrylate/ethylhexyl acrylate copolymer; acrylates/dimethylaminoethyl methacrylate copolymer; acrylates/ethylhexyl acrylate copolymer; acrylates/ethylhexylacrylate/HEMA/styrene  
10 copolymer; acrylates/hydroxyesters acrylates copolymer; acrylates/laurylacrylate/stearyl acrylate/ethylamine oxide methacrylate copolymer; acrylates/octylacrylamide copolymer; acrylates/propyl trimethicone methacrylate copolymer; acrylates/stearyl acrylate/dimethicone methacrylate copolymer; acrylates/VP copolymer; and acrylates/VP/dimethylaminoethyl methacrylate/diacetone acrylamide/hydroxypropyl acrylate copolymer. Polyvinyl alcohol and  
15 water-soluble polyvinyl esters can also be employed.

More preferred film-forming agents include sodium acrylates copolymer, sodium acryloyldimethyl taurate copolymer, ethyl methacrylate/N-butyl acrylate/2-methylhexyl acrylate copolymer, and butyl acrylate/hydroxyethyl methacrylate copolymer. Polymeric blends, such as  
20 Interpolymer's SYNTRAN EX-100 and Kobo Product's DAITOSOL 5000 SJ are also useful as synthetic polymer film forming agents in the composition employed in the method of the present invention.

Depending on whether the post-application expanding composition is mostly water or  
25 mostly oil, an appropriate film forming agent can be utilized. In point of fact, when the post-expanding composition is an emulsion, a water-soluble film forming agent, an oil-soluble film forming agent, or both, can be employed.

When the post-expanding composition is mostly oil (either organic or synthetic), an oil-  
30 soluble synthetic polymer can be employed as the film forming agent. Suitable oil-soluble synthetic polymers include, for example, polyurethane-1, polyurethane-2, polyurethane-3, polyurethane-4,

polyurethane-5, polyurethane-6, polyurethane-7, polyurethane-8, polyurethane-9, polyurethane-10, polyurethane-11, polyethylene, oxidized polyethylene, polypropylene, tetramethyl tetraphenyl trisiloxane, tricontanyl trimethyl pentaphenyl trisiloxane, styrene/MA copolymer, styrene/ DVB copolymer, various quaternary ammonium synthetic polymers, and crosspolymer, such as PVM/MA decadiene crosspolymer.

Various oil-soluble derivatives of polyvinyl pyrrolidone copolymers can also be used, with polyvinylpyrrolidone/decene copolymer and poly (vinyl pyrrolidone/ 1-triacontene) being preferred. The ethyl ester of PVM/MA copolymer can be used as well.

Water-soluble polyurethanes can also be used as the film forming agent, for example, EPQ 30 and EPQ 31 (Johnson Polymers) and the polyester urethane GK 910 (ALZO International, Inc.).

Preferably, the film forming agent is present in the post-application expanding composition in a concentration of from about 1 to about 50% by weight, more preferably about 5 to about 40 % by weight, most preferably about 8 to about 30 % by weight, and optimally about 10 to about 25 % by weight, based on the total weight of the post-application expanding composition.

When the post-expanding composition is applied on the skin, such as the lips or face, the volatile agent will release and cause the surfactant and solvent for the surfactant to swell/expand the composition. When the film forming agent sets, it fixes at least a portion of the swelled/expanded composition on the skin in its swelled/expanded state, thereby imparting, in the case of the lips, the appearance of fullness and in the case of the face, a desirable leveling effect and/or masking effect. Furthermore, the composition employed in the method of the present invention delivers a unique aesthetic feature manifested in a light or airy feel due to the nature of the expanded composition.

As will be discussed below, the post-application expanding composition may contain a pigment dispersion that includes one or more film forming agents. The amount of film forming

agent contributed by the pigment dispersion is considered in the total amount of film forming agent in the post-application expanding composition. For example, if the post-application expanding composition contains 50 wt%, based on the total weight of the composition, of a pigment dispersion that further contains 40 wt%, based on the total weight of the pigment dispersion, of a film forming agent, the composition of the invention has 20 wt%, based on the total weight of the composition, film forming agent (due to the contribution of the pigment dispersion). Additional film forming agent may be added. However, from a cost standpoint it is preferred that the total not exceed about 50 wt%, based upon the total weight of the composition.

While the present inventors do not wish to be bound to any one theory, it is believed that during the post-foaming action the film forming agent will set, thus, locking or sealing the foam lattice in place, either by forming a film, preferably a flexible film, over at least a portion of the surface of the foam or by increasing the rigidity of the foam lattice thereby stabilizing the foam. Preferably, a film will form over greater than about 50% of the surface of the foam, and more preferably over greater than about 75% of the surface of the foam. Alternatively, the film forming agent increases the rigidity of the foam lattice by greater than about 50%, and more preferably by greater than about 75%.

Since the compositions employed in the method of the present invention are preferably used as cosmetic compositions for application to the skin, preferably the lips and/or face, it is preferred that the film forming agent be of the type and amount to allow the composition to be removed from the user with water, mild soap or a mild cosmetic cleanser. Where water washability/rinseability is not required, a non-water-soluble film forming agent can of course be employed.

#### Colorant

An optional component of the post-application expanding composition is a colorant, preferably a pigment.

The cosmetic composition employed in the method of the present invention can be transparent or colored. Preferably, when it is to be applied to the lips, it is colored. Prior art post-foaming gels have included colorants as an optional ingredient to give the composition a pleasing appearance. The composition employed in the method of the present invention, optionally,  
5 incorporates one or more colorants in an amount sufficient to mask the color of the foam, which is usually white. When the composition contains, for example, pigment in an amount sufficient to mask the color of the foam and impart a color to skin treated with the composition, such as the lips, the composition can be used as a lipstick, lip gloss or other lip colorant. Alternatively, the composition can contain pigment(s) in an amount and of a type such that the composition when  
10 applied to the skin will function as an eyeshadow, concealer or foundation.

Virtually any level of colorant, preferably pigment, can be used so long as it substantially alters (preferably masks) the color of the foam that is otherwise produced absent the colorant. Preferably the colorant, preferably pigment(s), is present in an amount sufficient to impart a  
15 color to the skin on which it is applied. When the post-application expanding composition is to be applied to the skin, it generally includes about 0.5 to about 30% by weight, preferably about 1 to 15% by weight, and more preferably about 2 to about 10% by weight, colorant, preferably pigment, based upon the total weight of the post-application expanding composition.

20 Thus, a post-application expanding composition for application to the skin, preferably to the lips, preferably includes as a component, a colorant, preferably a pigment, most preferably a pigment dispersion containing one or more film forming agents, which are preferably film forming polymers. The pigment dispersion is preferred because of the physical attributes associated with a finely dispersed, clump free, color solution providing added film forming  
25 capability, particularly in the case of a lip coloring product.

Examples of pigment dispersions that can be employed include the following pigment dispersions available from Kobo Products:

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## WSJ24BAMP

(INCI Name: Water (and) Acrylates/Octyl acrylate copolymer (and) Iron oxides (C.I.77499)(and) Sodium acrylate/Sodium acryloyldimethyl taurate copolymer (and) Aminomethyl propanol);

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## WSJ22RAMP

(INCI Name: Water (and) Acrylates/Octyl acrylate copolymer (and) Iron oxides (C.I.77491)(and) Sodium acrylate/Sodium acryloyldimethyl taurate copolymer (and) Aminomethyl propanol);

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## WSJ20YAMP

(INCI Name: Water (and) Acrylates/Octyl acrylate copolymer (and) Iron oxides (C.I.77492) (and) Sodium acrylate/Sodium acryloyldimethyl taurate copolymer (and) Aminomethyl propanol);

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## WSJ30AMPC

(INCI Name: Water (and) Acrylates/Octyl acrylate copolymer (and) Titanium dioxide (and) Sodium acrylate/Sodium acryloyldimethyl taurate copolymer (and) Aminomethyl propanol);

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## GLW60BAMP

(INCI Name: Iron oxide (C.I.77499) (and) Water (and) Glycerin (and) Aminomethyl propanol);

## GLW55RAMP

25 (INCI Name: Iron oxide (C.I.77491) (and) Water (and) Glycerin (and) Aminomethyl propanol);

## GLW45YAMP

(INCI Name: Iron oxide (C.I.77491) (and) Water (and) Glycerin (and) Aminomethyl propanol); and

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## GLW75AMPC

(INCI Name: Titanium dioxide (and) Water (and) Glycerin (and) Aminomethyl propanol).

Pearl type pigments can also be employed, for example,

35 GEMTONE OPAL: (available from Engelhard Corp.)

Mica (and) Iron oxides (and) Titanium dioxide;

PEARLSECENT COPPER: (available from Presperse);

40 TIMICA GOLD SPARKLE: (available from Engelhard Corp.)

Mica (and) Titanium dioxide (and) Iron oxides;

TIMICA NU-ANTIQUÉ BRONZE : (available from Engelhard Corp.)

Mica (and) Iron oxides (and) Titanium dioxide;

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VISIONAIRE AMBER: (available from Presperse)  
Aluminum (and) Silicon dioxide;

PRESTIGE SILKY GOLD: (available from Presperse);

PRESTIGE DAZZLING SILVER: (available from Presperse);

PRESTIGE BRIGHT RED: (available from Presperse); and

PRESTIGE DAZZLING RED GOLD: (available from Presperse).

Talc, for example, ULTRATALC FS:(available from Cardre) Talc &  
Tridecafluorooctyltriethoxy silane can also be employed.

It should be appreciated that in lieu of the about 0.5 to about 30% by weight of pigment, that is typically employed, the post-application expanding composition can contain from about 0.5 to about 90% by weight of a pigment dispersion comprised of polymeric film forming agents, pigment, emulsifier and other adjuvants. Thickeners, such as for example, COVAGEL, available from LCW, can also be utilized.

#### Optional Ingredients

The post-application expanding composition can optionally contain ingredients typically employed in cosmetics, provided they do not adversely effect the performance of the composition so as to prevent realization of its beneficial effects. Such additional ingredients include, for example, vitamins, antioxidants, sunscreens, and preservatives.

#### Cosmetic Composition

It should be appreciated that the composition employed in the method of the present invention can be formulated as a gel, cream, emulsion, low or high viscosity liquid or semi-solid and can be packaged in a pressurized system or non-pressurized system. When pressurized, it will be suitably packaged in an aerosol container. When non-pressurized, it will be suitably packaged in a closed, preferably sealed, container.

It should be further appreciated that the cosmetic composition of the present invention can bring about the benefits of the invention, particularly as it relates to the facial skin benefits such as masking fine lines and wrinkles, depressions, acne scars and skin leveling, while being substantially free, and preferably totally free, of skin care active agents. Optionally, the cosmetic composition of the present invention may contain such active agents, for example, one or more exfoliating agents, such as alphahydroxy acids, betahydroxy acids, keto acids, oxa acids, oxa diacids, salicylic acids and retinol.

The following examples are offered merely to further illustrate the present invention, they are not intended to be limiting in any respect. It should be appreciated that unless otherwise indicated all percentages utilized herein are percent by weight, based on the total weight of the post-application expanding composition.

#### Pressurized System

Examples 1 through 14, which follow, illustrate post-application expanding compositions that employ a blowing agent to generate the post-foaming action and require packaging in a pressurized container.

A general formula for a particularly preferred formulation in accordance with the present invention is set forth in the following Example 1.

#### EXAMPLE 1

When the cosmetic composition of the present invention employs a post-foaming component as described in US patent 3,541,581, the post-application expanding composition may include:

1. A solvent or solublizing component that coupled with a surfactant provides lathering properties is compatible with film forming agents and allows for the manufacture of a stable gel. Water, deionized, distilled or even tap water, is preferred as the solublizing component. It is generally employed in a range of about 15 to about 90% by weight, based on the total weight of the composition.

Alcohol or a mixture of one or more alcohols and water can also be employed as a solubilizing component.

2. A water-soluble soap component prepared by alkaline hydrolysis of a C<sub>10</sub>-C<sub>22</sub> fatty acid, for example, through use of ammonia, low molecular weight amines, especially alkanolamines and alkali metals, especially sodium and potassium. Preferably the water-soluble component is selected from sodium, potassium and triethanolamine salts of high molecular weight fatty acids (C<sub>10</sub> – C<sub>22</sub>). Palmitic acid, stearic acid, oleic acid, myristic acid, palm and coconut oil fatty acids are preferred. Additionally, betaines and sultaines can be employed, alone or in combination with the previously mentioned sodium, potassium or triethanolamine salts of fatty acids, so as to accomplish the foaming action, or simply for boosting foaming. Typically, the water-soluble soap component is present in a concentration of from about 0.1 to about 25% by weight, based on the total weight of the composition.
3. A water-soluble viscosity increasing or gelling component selected from synthetic sucrose derivatives (such as carbomer), cellulose gums (such as hydroxyethyl cellulose and carboxymethyl cellulose) and natural hydrophilic colloids (such as carrageenans). The water-soluble viscosity increasing or gelling agent is generally employed in a concentration of from about 0.1 to about 5% by weight, based on the total weight of the composition, depending upon the choice of thickener.
4. A film forming agent in a concentration of from about 1 to about 50% by weight, based on the total weight of the composition.
5. A volatile or blowing agent to initiate post-foaming.
6. A colorant is optionally included in an amount from about 1 to about 70 % by weight, based on the total weight of the composition. The colorant is preferably a pigment, and most preferably a pigment dispersion.

7. A preservative is optionally included. NIPASTAT, GERMABEN II, LIQUAPAR OIL, AND LIQUAPAR PE are examples of preservative systems that can be utilized. They are generally employed in a concentration effective to inhibit microbial growth. Preferably, the preservative is present in an amount about 0.1 to about 0.8% by weight, based on the total weight of the composition.

### EXAMPLE 2

#### Typical Method of Manufacture

A composition employable in the method of the present invention may be made according to the following general procedure. Although the process employs a specified formulation to exemplify the process employed, other compositions of the invention can be similarly prepared.

| Phase | Ingredient                  | wt. % |
|-------|-----------------------------|-------|
| A     | Deionized water (DM)        | 43.01 |
| A     | Hydroxyethylcellulose (HEC) | 0.5   |
| B     | Triethanolamine (TEA)       | 1.0   |
| B     | Oleth-3-phosphate           | 0.5   |
| B     | Isoceteth-20                | 0.5   |
| B     | Palmitic acid               | 3.0   |
| C     | SYNTAN EX-100               | 18.0  |
| C     | DAITOSOL 5000SJ             | 10.0  |
| C     | POLYURETHANE                | 1.0   |
| C     | Cocamidopropyl Betaine      | 0.5   |
| D     | WSJ24BAMP                   | 2.02  |
| D     | WSJ24RAMP                   | 11.43 |
| D     | WSJ24AMPC                   | 2.91  |
| D     | WSJ24YAMP                   | 3.63  |
| D     | LIQUAPAR                    | 0.5   |
| E     | Isopentane                  | 1.5   |

#### Procedure:

- Sprinkle HEC into water under medium/slow (400-600 RPM) tripleL blade mix. Allow HEC to fully disperse with no clumps
- Cover and heat phase A to 75°C
- Add phase B ingredients about 3-5 minutes apart thereby allowing each to fully mix/disperse before adding the next
- Mix the combined phases A and B at 75°C for 10 minutes
- Add phase C ingredients one at a time to the mixture of phases A and B allowing the batch temperature to come back up to 75°C before adding next.
- Mix the combination of phases A, B and C at 75°C for 15 minutes

- Remove heat and switch to sweep blade at 50 RPM
- At about 45°C, add pigment dispersion(s) slowly under sweep. Use spatula to scrape sides of beaker and ensure thorough mix
- At about 30°C, add preservative under sweep
- Continue the sweeping mixing until the mixture reaches room temperature
- Cool the mixture to about 2 to about 5°C then add the volatile agent (isopentane), at about the same temperature, under high speed agitation. Charge the resultant mixture into a suitable pressure resistant container.

**EXAMPLES 3 -8**  
**Plumping Lipsticks (Pressurized)**

| Ingredients                        | Ex. 3 | Ex. 4 | Ex.5  | Ex. 6 | Ex. 7 | Ex. 8 |
|------------------------------------|-------|-------|-------|-------|-------|-------|
| Distilled Water                    | 22.76 | 43.26 | 23.76 | 24.76 | 42.2  | 41.26 |
| Oleth-3 phosphate                  | 0.5   | 0.5   | 0.5   | 0.5   | 0.5   | 0.5   |
| Isoceteth-20                       | 0.5   | 0.5   | 0.5   | 0.5   | 0.5   | 0.5   |
| Cocamidopropyl Betaine             | 0.5   | 0.5   | 0.5   | 0.5   | 0.5   | -     |
| Palmitic acid                      | 3.0   | 3.0   | 3.0   | 3.0   | 1.5   | 3.0   |
| Triethanolamine 99%                | 1.0   | 1.0   | 1.0   | 1.0   | 0.8   | 1.0   |
| SYNTRAN EX-100                     | 18.0  | 18.0  | 18.0  | 10.0  | 18.0  | 18.0  |
| DAITOSOL 5000 SJ                   | 12.0  | 10.0  | 10.0  | 10.0  | 12.0  | 10.0  |
| Johnson polymer EPQ                | -     | 1.0   | 1.0   | 1.0   | 1.0   | -     |
| WSJ24 BAMP                         | 2.02  | 2.02  | 2.02  | 2.02  | 2.02  | 2.02  |
| WSJ22 RAMP                         | 11.43 | 11.43 | 11.43 | 11.43 | 11.43 | 11.43 |
| WSJ30 AMPC                         | 2.91  | 2.91  | 2.91  | 2.91  | 2.91  | 2.91  |
| WSJ20 YAMP                         | 3.63  | 3.63  | 3.63  | 3.63  | 3.63  | 3.63  |
| Fumed silica talc                  | 1.0   | -     | -     | 1.0   | 1.0   | 1.0   |
| BRIGHT RED (pearl)                 | 7.5   | -     | 7.5   | -     | -     | 2.5   |
| DAZZLING SILVER (pearl)            | 10.0  | -     | 10.0  | -     | -     | 1.5   |
| CLOISONNE SATIN ROUGE              | -     | -     | -     | 2.5   | -     | -     |
| Isopentane                         | 1.5   | 1.5   | 1.5   | 1.5   | -     | 1.0   |
| N-Pentane / Isopentane (1:1 ratio) | -     | -     | -     | -     | 1.5   | -     |
| LIQUAPAR                           | 0.5   | 0.5   | 0.5   | 0.5   | 0.5   | 0.5   |
| Hydroxyethyl cellulose             | 0.25  | 0.25  | 0.25  | 0.25  | 0.76  | 0.75  |

**EXAMPLES 9 - 11**  
**Eye Shadow (Pressurized)**

| Ingredients                           | Ex. 9 | Ex. 10 | Ex.11 |
|---------------------------------------|-------|--------|-------|
| Distilled water                       | 49.87 | 52.34  | 51.44 |
| Oleth-3 phosphate                     | 0.5   | 0.5    | 0.5   |
| Isoceteth-20                          | 0.5   | 0.5    | 0.5   |
| Butylene glycol                       | 2.11  | 2.1    | 2.1   |
| Cocamidopropyl Betaine                | 0.5   | -      | 0.25  |
| Palmitic acid                         | 3.0   | 3.0    | 2.5   |
| Triethanolamine 99%                   | 0.8   | 1.0    | 0.8   |
| COVAGEL                               | 2.11  | -      | -     |
| DAITOSOL 5000 SJ                      | 10.0  | 10.0   | 10.0  |
| SYNTRAN EX-100                        | 12.0  | 12.0   | 12.0  |
| Johnson polymer EPQ                   | -     | -      | 1.0   |
| TiO <sub>2</sub>                      | 3.26  | 3.26   | 3.26  |
| GEMTONE TAN OPAL                      | 1.94  | 1.94   | 1.94  |
| PEARLESCENT<br>COPPER                 | 1.61  | 1.61   | 1.61  |
| Mica                                  | 2.09  | 2.09   | 2.09  |
| Fumed silica talc                     | 1.94  | 1.94   | 1.94  |
| TIMICA GOLD                           | 2.35  | 2.35   | 2.35  |
| NU-ANTIQUÉ BRONZE                     | 1.85  | 1.85   | 1.85  |
| VISION AMBER                          | 1.52  | 1.52   | 1.52  |
| Isopentane                            | 1.25  | -      | 1.25  |
| N-Pentane / Isopentane<br>(1:1 ratio) | -     | 1.0    | -     |
| LIQUAPAR                              | 0.5   | 0.5    | 0.5   |
| Hydroxyethyl cellulose                | 0.35  | 0.5    | 0.6   |

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**EXAMPLES 12 - 14**  
**Foundation and/or Concealer (Pressurized)**

| Ingredients                          | Ex.12 | Ex. 13 | Ex.14 |
|--------------------------------------|-------|--------|-------|
| Distilled water                      | 23.25 | 24.51  | 27.44 |
| Oleth-3 phosphate                    | 0.25  | 0.4    | 0.5   |
| Isoceteth-20                         | 0.25  | 0.4    | 0.5   |
| Butylene glycol                      | 19.12 | 18.0   | 18.0  |
| Propylene glycol                     | 4.59  | 4.59   | 4.5   |
| Cocamidopropyl Betaine               | 0.21  | 0.25   | 0.25  |
| Palmitic acid                        | 1.26  | 1.5    | 2.0   |
| Triethanolamine 99%                  | 0.5   | 0.7    | 0.8   |
| COVAGEL                              | 2.11  | -      | -     |
| DAITOSOL 5000 SJ                     | 3.5   | 4.0    | 3.5   |
| SYNTRAN EX-100                       | 7.58  | 8.0    | 7.5   |
| Kaolin                               | 3.0   | 2.5    | 2.5   |
| TiO <sub>2</sub> Glycerin dispersion | 25.0  | 25.0   | 22.0  |
| Red glycerin dispersion              | 2.71  | 2.5    | 2.71  |
| Black glycerin dispersion            | 0.4   | 0.3    | 0.4   |
| Yellow glycerin dispersion           | 3.37  | 3.0    | 3.25  |
| Mica                                 | 1.05  | 1.0    | 1.0   |
| Fumed silica talc                    | -     | 1.5    | 1.0   |
| Isopentane                           | 1.25  | -      | 1.25  |
| N-Pentane / Isopentane (1:1 ratio)   | -     | 1.0    | -     |
| LIQUAPAR                             | 0.5   | 0.5    | 0.5   |
| Hydroxyethyl cellulose               | 0.1   | 0.35   | 0.4   |

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Non-Pressurized Systems

It should be noted that all of the alternative systems (the Solubilization, Microemulsion and Two Part Systems), referred to herein as the Non-Pressurized Systems, make use of a film forming agent(s), colorant(s), and surfactant(s) in much the same way the compositions requiring storage in a pressurized container.

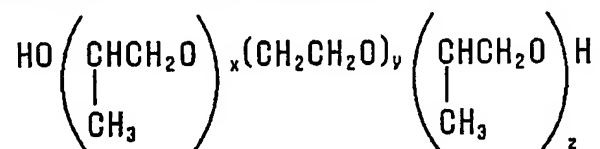
I. Solubilization System

When the post-application expanding composition used in the method of the present invention is based on solubilization of the volatile agent it employs:

(1) an effective solubilizing amount, preferably about 0.5% to about 35%, more preferably about 5% to about 20%, by weight, based on the total weight of the post-application expanding composition, of a primary solubilizing agent for the volatile agent. The primary solubilizing agent is:

5 (A) at least one block polymer, preferably a block polymeric ether selected from the group consisting of:

(i) MEROXAPOL block polymer surfactants having the general formula:



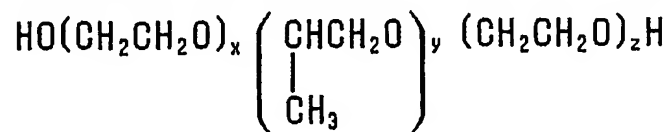
10 wherein x has an average value of 7 to 21,

y has an average value of 4 to 16,

and z has an average value of 7 to 21, and x equals z.

Suitable MEROXAPOL block polymer surfactants include, MEROXAPOL 105, 108, 171, 172, 174, 178, 251, 252, 254, 255, 258, 311, 312, and 314. (see The  
15 Cosmetic Toiletry and Fragrance Association, International Cosmetic Ingredient Dictionary and Handbook, Vol. 2, 9<sup>th</sup> Edition, 2002, pp. 959-961.) Preferred MEROXAPOL block polymers include the PLURONIC R series (available from BASF);

20 (ii) POLOXAMER block polymer surfactants having the general formula:



wherein x has an average value of 2 to 128,

y has an average value of 16 to 67,

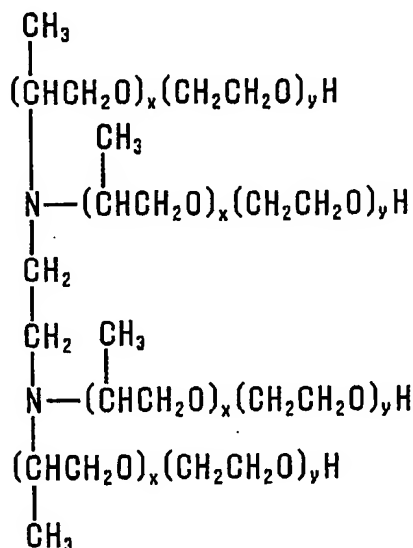
and z has an average value of 2 to 128, and x equal z.

25 Suitable POLOXAMER block polymer surfactants include: POLOXAMER 101, 105, 108, 122, 123, 124, 181, 182, 183, 184, 185, 188, 212, 215, 217, 231, 234, 235, 237, 238, 282, 284, 288, 331, 333, 334, 335, 338, 401, 402, 403, 407,



POLOXAMER 105 benzoate and POLOXAMER 182 dibenzoate. (see The Cosmetic Toiletry and Fragrance Association, International Cosmetic Ingredient Dictionary and Handbook, Vol. 2, 9<sup>th</sup> Edition, 2002, pp. 1270-1275.) Preferred POLOXAMER block polymers include the PLURONIC L series (available from BASF);

and (iii) POLOXAMINE block polymer surfactants having the general formula:



wherein x is 4 to 32,

and y is 2 to 122.

Suitable POLOXAMINE block polymers surfactants include: POLOXAMINE 304, 504, 604, 701, 702, 704, 707, 901, 904, 908, 1101, 1102, 1104, 1301, 1302, 1304, 1307, 1501, 1502, 1504, and 1508. (see The Cosmetic Toiletry and Fragrance Association, International Cosmetic Ingredient Dictionary and Handbook, Vol. 2, 9<sup>th</sup> Edition, 2002, pp. 1275-1279.) Preferred POLOXAMER block polymers include the TETRONIC series (available from BASF);

(B) Polyvinyl alcohol; or a polyvinyl alcohol alternative selected from the group consisting of: PEG-800/polyvinyl alcohol copolymer, sodium MA/vinyl alcohol copolymer, acetylated polyvinyl alcohol, vinylamine/vinyl alcohol copolymer, VP/VA copolymer, polyvinyl acetate and polyvinylacetal

diethylaminoacetate. PEG-800/polyvinyl alcohol copolymer, sodium MA/vinyl alcohol copolymer, acetylated polyvinyl alcohol, vinylamine/vinyl alcohol copolymer and VP/VA copolymer are preferred polyvinyl alcohol alternatives; or

(C) a mixture of (A) and (B).

(2) 0% to 25%, preferably about 0.5% to about 20%, more preferably about 0.75% to about 15%, most preferably about 1% to about 10%, by weight, based on the total weight of the post-application expanding composition, of a secondary solubilizer for the volatile agent. The secondary solubilizing agent is preferably an ammonium cocoyl isethionate selected from the group consisting of sodium oleoyl ammonium cocoyl isethionate, sodium myristoyl ammonium cocoyl isethionate, sodium lauroyl ammonium cocoyl isethionate, sodium cocoyl ammonium cocoyl isethionate, ammonium cocoyl isethionate and mixtures thereof. Sodium cocoyl ammonium cocoyl isethionate and ammonium cocoyl isethionate are preferred.

(3) about 0% to about 20%, preferably about 0.1% to about 15%, more preferably about 1% to about 10%, most preferably about 2% to about 5%, by weight, based on the total weight of the post-application expanding composition, of an anionic surfactant, preferably a salt of a C<sub>8</sub> to C<sub>22</sub> fatty acid, more preferably a salt of a C<sub>10</sub> to C<sub>18</sub> fatty acid, and most preferably a triethanolamine or alkali metal salt of palmitic acid or stearic acid; the salt being employed as such, or generated in situ in the post-application expanding composition by, for example, the reaction of the fatty acid and triethanolamine.

The combination of surfactants is employed in an amount sufficient to solubilize the volatile (blowing) agent component of the post-application expanding composition in the composition, thereby obviating the necessity for storing the composition in a pressurized container;

(4) 0% to about 20%, preferably about 0.1% to about 15%, more preferably about 1% to about 10%, most preferably about 2% to about 5% of an amphoteric or zwitterionic surfactant. Amphocarboxylates, alkyl betaines, amidoalkyl betaines, amidoalkyl sultaines, amphophosphates, phosphobetaines, pyrophosphobetaines, carboxyalkyl alkyl polyamines, alkyl amino monoacetates, alkyl amino diacetates, and mixtures thereof can be employed. Betaine surfactants are preferred. Cocamidopropyl betaine is most preferred;

(5) about 0.5% to about 20%, preferably about 1% to about 10% by weight, based on the total weight of the post-application expanding composition, of a volatile (blowing) agent. Suitable volatile (blowing) agents include any organic volatile (halogenated or non-halogenated) with a vapor pressure from about 0.5 Torr to about 30,000 Torr at a temperature of about 0°C to about 100°C. Examples of preferred organic volatile agents include, but are not limited to, n-pentane, isopentane, n-butane, isobutane, isobutene, neopentane, cyclopentane, hexane, trichlorotrifluoroethane, 1,2-dichloro, 1,1,2,2-tetrafluoroethane, and mixtures thereof. Preferably, the volatile (blowing) agent is selected from the group consisting of n-pentane, isopentane, n-butane, isobutane, isobutene, neopentane, cyclopentane, hexane, and mixtures thereof;

(6) a film-forming agent in an amount effective to entrap at least a portion of foam produced by interaction of the surfactant(s), the solvent for the surfactant(s), and the volatile (blowing) agent, which occurs when the volatile (blowing) agent is released from the post-application expanding composition;

(7) 0% to about 5%, preferably about 0.5% to about 4%, more preferably about 0.75% to about 3%, most preferably about 1% to about 2%, by weight, based on the total weight of the post-application expanding composition, of an emollient selected from the group consisting of ethylhexyl hydroxystearate, ethylhexyl stearate, butylenes glycol stearate, C<sub>12-15</sub> alkyl benzoate, C<sub>12-13</sub> alkyl lactate, caprylic/capric glycerides, castor/olive oil esters, cetearyl ethylhexanoate, cetyl oleate, cocoglycerides, cyclomethicone, cyclopentasiloxane, dimethiconol, dimethicone PEG-7 isostearate,

ethylhexyl isostearate, ethylhexyloxyglyceryl palmitate, ethylhexyl palmitate, glyceryl palmitate, hydrogenated polydecene, hydrogenated polyisobutene, isodecyl stearate, isopropyl palmitate, lanolin, mineral oil, PEG-11 cocoa butter glycerides, and mixtures thereof. Octylhydroxy stearate is most preferred;

5

(8) optionally, a colorant, preferably a pigment, more preferably a pigment dispersion, in an amount sufficient to impart a color other than white to the skin. Liquid pigment dispersions containing film-forming polymers are preferred. The most preferred pigment dispersion is WSJ24BAMP. It is preferably used in an amount of about 5% to about 50%, more preferably, about 10% to about 40%, most preferably, about 20% to about 35%, by weight, based on the total weight of the post-application expanding composition.

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As used herein "an effective solubilizing amount" or "an amount sufficient to solubilize" means an amount sufficient to prevent any significant separation of the volatile agent from the composition. Thus, for example, an effective solubilizing amount will substantially prevent the formation of a separate layer of the volatile agent. Typically, an effective solubilizing amount will be from about 0.5% to about 20%, preferably about 5% to about 10% by weight, based on the total weight of the final composition. Higher amounts can be employed but are likely to be economically unfeasible.

20

It should be noted that a particularly preferred Solubilization System employs a triblock copolymer surfactant and polyvinyl alcohol or an ammonium cocoyl isethionate. A more preferred Solubilization System employs a triblock copolymer surfactant, an ammonium cocoyl isethionate, such as sodium or ammonium cocoyl isethionate, and polyvinyl alcohol.

25

Examples 15 through 18, which follow, illustrate post-application expanding compositions that employ solubilizing agent(s) for the blowing agent to generate the post-foaming action and not requiring packaging in a pressurized container.

30

The compositions of Examples 15 to 19 are prepared according to the following general procedure:

**EXAMPLE 15****Lipstick**

| Phase | Ingredient                    | wt. % |
|-------|-------------------------------|-------|
| A     | Deionized water (DM)          | 38.0  |
| A     | Sodium carboxymethylcellulose | 0.75  |
| A     | Polyvinyl alcohol             | 10.0  |
| A     | Triethanolamine (TEA)         | 1.5   |
| B     | Oleth-3-phosphate             | 0.5   |
| B     | Isoceteth-20                  | 0.5   |
| B     | Ethylhexyl hydroxyl stearate  | 1.25  |
| B     | Palmitic acid                 | 3.0   |
| C     | ALLIANZ OPT                   | 10.0  |
| C     | SYNTRAN EX-100                | 5.0   |
| D     | WSJ24BAMP                     | 2.0   |
| D     | WSJ22 RAMP                    | 10.0  |
| D     | WSJ30 AMPC                    | 2.5   |
| D     | WSJ20 YAMP                    | 3.5   |
| E     | LIQUAPAR                      | 0.5   |
| F     | PLURONIC L-43 block polymer   | 5.0   |
| F     | Ammonium cocoyl isethionate   | 3.0   |
| F     | Isopentane/Pentane (1:1)      | 3.0   |

- (a) sprinkle the sodium carboxymethylcellulose into the water under medium/slow (400-600 rpm) tripleL blade mix. Allow the sodium carboxymethyl cellulose to fully disperse with no clumps;
- (b) add the polyvinyl alcohol slowly and allow adequate time for its dispersal;
- (c) add the triethanolamine and cover and heat phase A to 75°C;
- (d) at 75°C, add phase B ingredients allowing about 3-5 minutes between each addition so as to permit each ingredient to fully mix/disperse before adding the next;
- (e) mix the combined phases A and B at 75°C for about 10 minutes;
- (f) discontinue heating and cool to about 55°C, replace the propeller with a waffle iron sweep and continue to sweep at 80 to 100 rpm;
- (g) at 55°C, slowly add phase C directly into the batch and mix for five minutes;
- (h) cool to about 45°C, add phase D slowly under sweep mixing. Use a spatula to scrape the sides of the vessel and ensure a thorough mix;

- (i) at about 30°C, add phase E under sweep mixing;
- (j) continue the sweep mixing and cooling until the composition reaches approximately 2 °C to about 5°C;
- (k) prepare phase E separately from the main composition and under cold conditions (approximately 2 °C to about 5°C) (It should be noted that the processing temperature depends on the volatile agent used. With a more stable volatile agent a higher temperature can be employed);
- (l) chill the block polymer and place it in a cold jacketed vessel, add the chilled volatile agent(s) and mix for about 10 minutes;
- (m) slowly drizzle the ammonium cocoyl isethionate into the pentane/block polymer mix and continue mixing for about 5 minutes;
- (n) using a large homogenizer, slowly add chilled phase E to the main batch (phases A, B, C, and D) and mix until phase E is fully dispersed; then charge the resultant mixture into a suitable vessel.

**EXAMPLES 16 - 19**  
**Plumping Lipstick Formulations (Non-Pressurized)**

| Ingredients                        | Ex. 16 | Ex. 17 | Ex.18 | Ex. 19 |
|------------------------------------|--------|--------|-------|--------|
| Distilled water                    | 26.76  | 31.71  | 37.71 | 32.51  |
| Oleth-3 phosphate                  | 0.5    | 0.5    | 0.5   | 0.5    |
| Isoceteth-20                       | 0.5    | 0.5    | 0.5   | 0.5    |
| Ethylhexyl hydroxyl stearate       | 1.75   | 1.75   | 1.75  | 1.75   |
| Cocamidopropyl Betaine             | 0.5    | 0.5    | 0.5   | 0.5    |
| Palmitic acid                      | 3.0    | 3.0    | 2.0   | 3.0    |
| Stearic acid                       | -      | -      | 0.5   | -      |
| Triethanolamine 99%                | 1.0    | 1.0    | 1.1   | 1.0    |
| SYNTRAN EX-100                     | 13.0   | -      | -     | -      |
| ALLIANZE OPT                       | 5.0    | 5.0    | 5.0   | 5.0    |
| Polyvinyl alcohol                  | -      | 10     | 10    | 10     |
| PLURONIC block polymer L-61        | -      | -      | 5.0   | 5.0    |
| PLURONIC block polymer 31R1        | 5.0    | 5.0    | -     | -      |
| Ammonium cocoyl isethionate        | 3.0    | 3.0    | 3.0   | 3.0    |
| Ployurethane (epq30 JP)            | -      | 1.0    | 1.0   | 1.0    |
| WSJ24 BAMP                         | 2.02   | 2.02   | 2.02  | 2.02   |
| WSJ22 RAMP                         | 11.43  | 11.43  | 11.43 | 11.43  |
| WSJ30 AMPC                         | 2.91   | 2.91   | 2.91  | 2.91   |
| WSJ20 YAMP                         | 3.63   | 3.63   | 3.63  | 3.63   |
| Fumed silica talc                  | 1.0    | -      | -     | -      |
| BRIGHT RED (pearl)                 | 7.0    | -      | 5.0   | 5.0    |
| DAZZLING SILVER (pearl)            | 8.0    | -      | 5.0   | 5.0    |
| CLOISONNE SATIN ROUGE              | -      | -      | -     | -      |
| Isopentane                         | 3.0    | -      | -     | -      |
| N-Pentane / Isopentane (1:1 ratio) | -      | 3.0    | -     | -      |
| Cyclopentane                       | -      | -      | -     | 5.0    |
| LIQUAPAR                           | 0.5    | 0.5    | 0.5   | 0.5    |
| Sodium carboxyethyl cellulose      | 0.5    | 0.5    | 0.75  | 0.75   |

## II. Microemulsion System

- 5           The following Examples 20-22 serve to illustrate microemulsion based compositions  
utilizable in the method of the present invention:

**EXAMPLES 20-22**

| Ingredient                                | Ex. 20 | Ex. 21 | Ex. 22 |
|-------------------------------------------|--------|--------|--------|
|                                           | wt. %  | wt. %  | wt. %  |
| Propylene glycol                          | 2.0    | 5.0    | 5.0    |
| Cyclomethicone                            | 15.0   | -      | -      |
| Isododecane                               | -      | 5.0    | -      |
| Oleth-3 phosphate                         | -      | -      | 5.0    |
| Oleth-10                                  | -      | -      | 2.0    |
| Palmitic acid                             | -      | 2.5    | 1.5    |
| Cocamidopropyl Betaine                    | 4.5    | 5.0    | 1.0    |
| Triethanolamine 99%                       | -      | 1.0    | 0.5    |
| PPG-10 cetyl ether<br>propylene glycol    | 5.0    | -      | -      |
| PPG-5 ceteth-20                           | 16.0   | -      | -      |
| Sodium lauryl ether sulfate-2EO           | -      | 10.0   | -      |
| Isostearyl benzoate                       | 10.0   | -      | -      |
| Light mineral oil                         | -      | -      | 10.0   |
| PVP                                       | 1.0    | -      | 2.0    |
| DAITOSOL 5000 SJ                          | 5.0    | 10.0   | 5.0    |
| SYNTRAN EX-100                            | -      | -      | -      |
| Iron oxide black (fine,treated)           | 1.0    | 1.0    | 1.0    |
| Iron oxide Red (fine,treated)             | 5.0    | 4.0    | 4.0    |
| Iron oxide yellow (fine,treated)          | 1.0    | 1.0    | 1.0    |
| Iron oxide brown (fine,treated)           | 1.0    | 2.0    | 2.0    |
| Isopentane                                | -      | 6.0    | -      |
| Cyclopentane                              | 10.0   | -      | -      |
| Cyclopentane / Isopentane (1 :1<br>ratio) | -      | -      | 10.0   |
| Methylparaben                             | 0.3    | 0.3    | 0.3    |
| GERMALL                                   | 0.2    | 0.2    | 0.2    |
| Sodium carboxymethyl<br>cellulose         | 0.25   | 0.2    | 0.5    |
| Distilled water                           | 22.75  | 46.8   | 49.0   |

**III. Two Part System**

5 In this embodiment, the volatile (blowing) agent, carbon dioxide, is generated in situ by the facile reaction of a cosmetically acceptable acid with a base, in the presence of water. The carbonic acid that is produced is unstable in water and at room temperature breaks down into water and carbon dioxide gas. The carbon dioxide foams (swells or expands) the composition.



Suitable acids include, but are not limited to, citric acid, boric acid, tartaric acid, succinic acid, malic acid, formic acid, glycolic acid, polyacrylic acid, polyaspartic acid and mixtures thereof. Microporous silica or a buffered mineral acid (such as hydrochloric acid or phosphoric acid) having a pH of 5 or less can also be employed. Citric acid is preferred.

5

Suitable bases include, but are not limited to, (i) inorganic carbonates and bicarbonates, for example, ammonium, alkali metal and alkaline earth metal carbonates and bicarbonates, and (ii) organic carbonates, such as diethyl carbonate, propylene carbonate and dipropyl carbonate. Magnesium carbonate, calcium carbonate, sodium bicarbonate, sodium carbonate, diethyl carbonate, propylene carbonate and dipropyl carbonate are preferred. Sodium and potassium bicarbonate are most preferred.

10

When a polyacrylic acid is employed as the acid reaction component the expansion caused by the release of carbon dioxide can be controlled by (i) increasing the pH, which serves to thicken the polymer film and/or by (ii) increasing the amount of water in the composition, which serves to retard the reaction.

15

A preferred embodiment for employing in situ generated carbon dioxide utilizes a two part composition. Each part is packaged in different chambers of a single two chambered container or the two parts are packaged in separate containers.

20

For example, citric acid is dispersed in an anhydrous first composition which is applied to, for example, the face. Simultaneously, or shortly thereafter, a second composition comprising a cosmetically acceptable base, such as sodium bicarbonate, is applied to the face and mixed with the first composition whereupon carbon dioxide evolves and the post-application expanding composition is produced. The carbon dioxide foams (swells or expands) the surfactant and solvent for the surfactant components of the post-application expanding composition. The film-forming agent component of the composition thereafter sets and entraps at least a portion of the produced foam so as to fix the composition in an expanded state.

25

30

Alternatively, anhydrous sodium bicarbonate and anhydrous acid are dispersed in an anhydrous first composition which is mixed on the face with an aqueous second composition containing the surfactant. The surfactant facilitates mixing and the carbon dioxide that is produced acts to foam the surfactant and solvent for the surfactant. When the film-forming agent  
5 component, preferably present in the aqueous solution, sets it entraps at least a portion of the produced foam lattice and fixes the post-application expanding composition in an expanded state.

In a preferred embodiment a first part of the post-application expanding composition,  
10 containing the carbonate or bicarbonate and the acid dissolved or dispersed in anhydrous polyethylene glycol is stored in one compartment of a dual compartment container. A second part of the post-application expanding composition, containing the formulation amount of water, is stored in the other compartment.

Alternatively, one part is stored in a first container and the other part is stored in a second  
15 container. The surfactant(s) and film-forming agent can be components of the aqueous part of the composition.

The acid and base can be dispersed in an anhydrous water-miscible vehicle or the acid  
20 can be contained in the anhydrous water-miscible vehicle and the base contained in the aqueous part of the composition. The reverse (the acid in the aqueous part and the base in the anhydrous part) can lead to potential eye irritation, color instability and a change in viscosity.

Anhydrous polyethylene glycol is highly preferred as a vehicle for the carbonate or  
25 bicarbonate and the acid reactants. Its hygroscopicity promotes speedy in-situ production of carbon dioxide when the aqueous part of the composition is mixed with the anhydrous acid/base containing part of the composition. A mixture of polyethylene glycols of varying molecular weight can be employed for control of formulation viscosity. Although anhydrous, polyethylene glycol is preferred, any viscous anhydrous cosmetically acceptable solvent that is readily  
30 miscible with water and in which the anhydrous acid and base can be suspended without co-reacting, can be employed. Sorbitol and glycerin are additional examples of such solvents.

It should be noted that as an alternative to separating the acid and base reactants in separate compartments, one can encapsulate the base so as to physically separate it from the other reactant.

5           Stoichiometric amounts of the acid and base (carbonate or bicarbonate) reactants should be employed. The co-reactants should be employed in amounts such that, when reacted, sufficient carbon dioxide is produced to interact with the surfactant(s) and solvent for the surfactant(s) to produce sufficient foam lattice and expansion before the film forming agent sets.

10           The following Examples 23-24 serve to illustrate two part system base skin care compositions utilizable in the method of the present invention:

### **EXAMPLE 23**

#### **Part A**

| <b>Ingredient</b>                            | <b>wt. %</b> |
|----------------------------------------------|--------------|
| PVP                                          | 2.0          |
| Cellulose Gum (2000 CPS)                     | 0.4          |
| Glyceryl stearate                            | 10.0         |
| Propylene glycol dicaprylate/dicaprate       | 8.0          |
| Cetearyl alcohol and sodium cetearyl sulfate | 6.1          |
| Methylparaben                                | 0.4          |
| Triethanolamine 99%                          | 1.6          |
| Pentaerythritol tetrastearate                | 1.0          |
| Stearic acid                                 | 5.0          |
| Isooctahexacontane                           | 2.5          |
| Glyceryl monostearate-self emulsifying       | 2.0          |
| Propylparaben                                | 0.2          |
| Acrylates copolymer/ Isododecane             | 0.1          |
| Isododecane/gellants/BHT                     | 2.5          |
| Acrylates copolymer -30% aqueous             | 1.5          |
| Soybean Oil                                  | 0.1          |
| Demineralized water                          | 56.6         |

15

**Part B**

| Ingredient                                                                                   | wt. % |
|----------------------------------------------------------------------------------------------|-------|
| Isododecane and ethylene/propylene/styrene copolymer and butylene/ethylene/styrene copolymer | 69.0  |
| Potassium bicarbonate/citric acid, powdered (18.4/11.6)                                      | 30.0  |
| PEG-80 Sorbitan laurate/cocamide surfactant                                                  | 1.0   |

For Part A, the cellulose gum is slowly dispersed in the water while vigorously stirring. The temperature is increased to 75°C. The remainder of the ingredients are blended in (with the triethanolamine added last) until the pH is measured as neutral. The batch is then slowly cooled to room temperature.

The Part B ingredients are mixed at room temperature until the powdered potassium bicarbonate/citric acid mixture and surfactant are thoroughly dispersed in the isododecane and ethylene/propylene/styrene copolymer and butylene/ethylene/styrene copolymer.

**EXAMPLE 24****Part A**

| Ingredient                          | wt. % |
|-------------------------------------|-------|
| PVM/MA copolymer                    | 1.0   |
| Methylparaben                       | 0.4   |
| Imidazolidinyl urea                 | 0.2   |
| PVP/VA copolymer -50% aqueous       | 30.0  |
| Propylene glycol                    | 4.0   |
| Glycerin                            | 1.0   |
| Alcohol SD 40B                      | 5.0   |
| PEG-80 Sorbitan laurate/cocamide    | 1.0   |
| Acrylates copolymer/butylene glycol | 10.0  |
| Demineralized water                 | 47.4  |

**Part B**

| Ingredient                                              | wt. % |
|---------------------------------------------------------|-------|
| PEG-400                                                 | 69.0  |
| Potassium bicarbonate/citric acid, powdered (18.4/11.6) | 30.0  |
| PEG-80 Sorbitan laurate/cocamide surfactant             | 1.0   |

For Part A, the ingredients are blended in the water at 45°C. The batch is then slowly cooled to room temperature. The Part B ingredients are mixed at room temperature until the powdered potassium bicarbonate/citric acid mixture and surfactant are thoroughly dispersed in the PEG-400.

Although not wishing to be bound thereby the present inventors theorize that the present invention may work in the following manner. When the composition of the present invention is applied to the lips or face, the film forming agent component of the composition begins to cure. The composition begins to generate foam causing the film, which is at that point fairly elastic, to expand. The film then sets up and though it is sufficiently rigid to trap the foam contained within it, it remains sufficiently elastic to allow subsequent flex of the skin upon which the composition is applied. The foamed material entrapped by the sufficiently elastic film acts to impart fullness to the lips and a leveling and/or masking effect on skin.

The post-application expanding composition may be packaged in many types of commercially available containers, including collapsible metal tubes and barrier-type aerosol dispensers. If an aerosol dispenser is employed, it is preferred that the post-application expanding composition be maintained in the container separate from the propellant by means of a bag, diaphragm or piston inside the container. This propellant is not to be confused with the volatile (blowing) agent that is a component of the composition. If a diaphragm or piston is employed, it can be driven by propellant or mechanical force, such as a spring.

Compositions according to the present invention may be packaged in, for example, the packaging systems described in US patents 2,995,521; 3,541,581; 3,654,167; 4,405,489; 4,528,111; 4,651,503; 6,165,456 and US Patent Application Publication US 2002/0122772 A1.

Compositions based on non-pressurized systems may be packaged in a closed, preferably sealed container.

It should be understood that the foregoing description is only illustrative of some embodiments of the present invention. Various alternatives and modifications can be devised by

those skilled in the art without departing from the invention. Accordingly, the present invention is intended to embrace all such alternatives, modifications and variances that fall within the scope of the appended claims.